

ASSESSMENT OF POSTURE IN SCHOOL GOING CHILDREN CARRYING BACKPACK

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ABSTRACT

Background

In today's global world, it has been observed that the children use backpacks as their sole carrier for going to the school, which has proved beneficial for students. Along with the advantages, there are unfortunately some disadvantages for the same. As these heavy backpack's load can put undue stresses on the spine of the growing children, thus it can cause some musculoskeletal problems and postural changes in children carrying it regularly to the school. The objectives of this study are to document the evolution of upright, static, sagittal posture in children and to identify possible critical phases of postural evolution.

Methods

Ethical Clearance was Obtained from institutional ethical committee. The study was explained to the school authority. After obtaining Permission from the School, The written consent was taken from students, parents and the study were conducted on 300 Students.

Results

Many Postural Changes Were Found Due To Heavy Backpack Such As Forward Head, Protracted Scapulae, Right Shoulder Depressed, Left Shoulder Depressed, Sway Back, Increased Lordosis, Scoliosis, Genu Valgum, Genu Varus, Hyper extended Knees.

Conclusions

The postural changes in children carrying backpack to school found were forward headed, protracted scapulae, right shoulder depressed, left shoulder depressed, sway back, increased lordosis, scoliosis, genu valgum, genu varus, hyper extended knees . The mean weight of school backpacks was 3.6 kg. The most common method of carriage was on the back, over two shoulders. The 133 students carried ranged 10-15% of school backpack weight as a percentage of body weight.

KEYWORDS: *Postural Changes, BMI, Age of Children, Weight of Backpack & Methods of Carriage of Backpack*

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INTRODUCTION

Posture is the position in which holds our body upright against gravity. For maintenance of this posture, there are strong muscles of the body needed that holds a posture against gravity. Due to Poor posture these muscles get weak, which produces increase strain on the supporting structures which may cause changes in the posture and in long term muscular skeletal deformities. The lifetime prevalence of low back pain among schoolchildren ranges

from 20% to 51%. Recent literature reviews indicate that back pain in children can be correlated to several risk factors such as prolonged sitting posture and faulty spinal posture. Because back pain during childhood and adolescence is known to be an important predisposing factor for experiencing back pain into adulthood, Therefore, prevention of and screening for risk factors of back pain in childhood is very important. Postural screening and evaluation protocols in the primary and secondary prevention of musculoskeletal conditions are still evolving. In particular, clinically relevant non-invasive data about critical phases of postural development in schoolchildren are lacking,⁴ which to be changed by examining the posture by taking a plumb line as reference.

Carrying irregular loads on the spine can cause soft tissues and muscles weak and also susceptible to the injury, these stresses can cause forward lean posture of head and trunk.³ Daily abnormal postural adaptations could result in pain and disability in children.¹

When the backpack is heavier due to loads of book the center of gravity shifts posteriorly, which may causes the chances of falling or postural changes.⁴

Methods of carrying backpacks may also influence pain. The asymmetric carrying that is having strap(s) on only one shoulder resulted in greater pain than the students those carries straps on both the shoulders. These methods of carriage can also cause postural changes and musculoskeletal changes in the school going children.⁴

The body weight and the backpack weight of the children also has an influence on the posture of the child. If his backpack weight exceeds more than 10-15% or 10-20% of his body weight, there are more chances of a child having postural changes and musculoskeletal problems.²

Thus my study was undertaken with the objective of determining the effect of increasing load of the backpack on a posture of school going children.

Need for Study: As the children in the age group from 11yrs -16yrs are at the critical stage of development of spine hence if the load is put in these stages there might be postural changes or any other musculoskeletal discomfort to the child.

Research Question: Is there any change in posture in school going children due to backpack?

HYPOTHESIS

Null Hypothesis: There is no any change in posture in school going children due to backpack

Alternative Hypothesis: There is a change in posture in school going children due to backpack.

REVIEW OF LITERATURE

- Grimmer et al (1999) conducted a study on the effect of backpack weight on adolescent head on neck posture and conclude that there was a significant change in crannio vertebral angle of students in response to backpack.

Australian journal of physiotherapy (2001)

- H.n.shasmin, at abu osman et al(2007): conducted a study on the effects of backpack and posture of school going and concluded that load for children below 12yrs old is between 10-15% of their body weight.

Springer –verlagBerlin Heidelberg 2007

- Jagdish hundekari and kalyan chilwantet al (2013) conducted a study on backpack load effects on posture school children and concluded that the increase in forward head posture in school going was significant.

Journal of dental and medical sciences: 2279-0861.vol 7, (May-June-2013)

- Yadollah zakeri and shraram baraz et al (2016) conducted a study of prevalence of lordosis, kyphosis, scoliosis, and dropped shoulders in school children using a backpack and concluded that the prevalence of dropped shoulders, lordosis, kyphosis was significant in children carrying backpack.

International journal of pediatric, vol 4, n.6, serial 30.Jul 2016.

- Snehaldharmayat et al (2017) conducted a study on posture assessment in school going children using backpack and conclude that 34.17% of age 14 yr girl had forward head posture and 33.3% of 13 yr age group had upper back kyphosis.and 24.3% of 10 yr girl had increased in lumbar lordosis.

Journal of nursing and health sciences 2320-1940 vol 6 issue 1 ver.v (Jan –feb 2017)

Aim

To assess the posture of school going children carrying backpacks.

Objectives

- To find out any postural changes
- To measure the weight of backpacks
- To measure the weight of childrens

METHODOLOGY

Study Design: Observational study

Study Duration: 1 year

Study Setup: Schools in Ahmednagar district

Sample Technique: random sampling

Sample Size: 300

MATERIALS

- weighing machine
- Stadiometer
- Measuring tape
- plumb line.

Inclusion Criteria

- Children population carrying their own backpack for 1 year of time.

- Child age (11-16yr).
- Healthy girls and boys students.

Exclusion Criteria

- Unable to stand on the weighing scale.
- Unable to carry a backpack.
- Children below 11 years.

Procedure: After the clearance from ethical committee meeting by the institutional ethical committee. The subject was then prepared for weight measurement on weighing machine. The weight was measured in kilograms (kg) and then the backpack's weight was also measured using a weighing machine which was measured in (kg). Then they were prepared for height measurement on steady meter.. Height was measured in centimeters (cm). The subject was then instructed to wear shorts. A plumb line was used as a reference of alignment for the body when to examine their posture. The normal and abnormal posture both was noted and recorded.

RESULTS

Participation Rate: Of the 300 consent forms issued, 300 completed all measurements and were included in the study. This included 169 boys and 131 girls of mean age 12 years.

Wt of School Backpack: Schoolbag weight ranged from 1-5.3kg. The mean schoolbag weight was 3.6kg.

Methods of Carriage of Backpack: Almost all students, 95%, used backpack style schoolbags with two straps, but only 65% carried their school bags on their backs using two straps.

School bag Pack Related Postural Changes: There was found many postural changes due to heavy backpack such as forward head =49, protracted scapulae =229, right shoulder depressed 27, left shoulder depressed = 12, sway back =42, increased lordosis =16 scoliosis=1, genu valgum =3, genu varus = 9, hyperextended knees = 17. And the mean of postural changes was 40.5 with 68.07 sd.

DISCUSSIONS

Participation Rate - Of the 300 consent forms issued, in school 1 (Anand vidyalaya, Ahmednagar INDIA) the response rate was 41.66%(n=125) and in school 2(Renavikar vidyalaya, Ahmednagar INDIA), the response rate was 58.33% (n=175) higher as compared to school1. This gave a total of 300 who completed the study; 41.66 %from school 1 (n=125) and 14% of school 2 (n=175).

Weight of Backpack- The mean weight of schoolbags in the study was 3.58kg. As there was variation between every child's backpack weight. The range of backpack weight was (1kg-3kg) as some children carried extra books to the school.

Methods of Carriage -The carriage of backpack on one shoulder has become a trend in today's world. However, unfortunately in our study 65% of students carry backpack on one shoulder only which can lead to postural changes.

Postural Changes Due to School Backpack —There was found many postural changes due to heavy backpack

such as Forward head =49, Protracted scapulae =229, Right shoulder depressed 27, Left shoulder depressed = 12, Sway - back =42, Increased lordosis =16 Scoliosis=1, Genu valgum =3, Genu varus = 9, Hyper extended knees = 17. And the mean of postural changes was 40.5 with 68.07 sd. Jagdish hundekari and kalyan chilwantet al (2013) did a similar study and concluded that the increase in forward head posture in school going was significant. Yadollah zakeri and shraram baraz et al (2016) conducted a study of prevalence of lordosis, kyphosis, scoliosis, and dropped shoulders in school children using a backpack and concluded that the prevalence of dropped shoulders, lordosis, kyphosis was significant in children carrying backpack.

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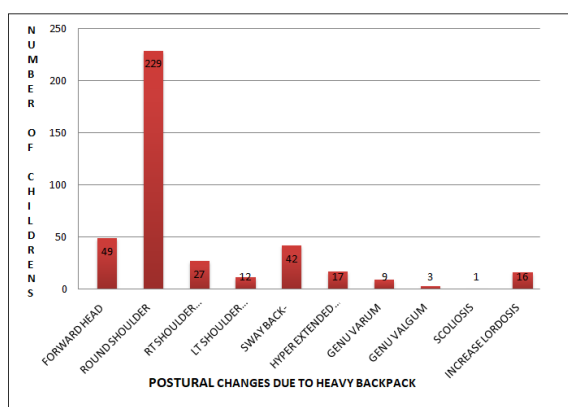


Figure 1

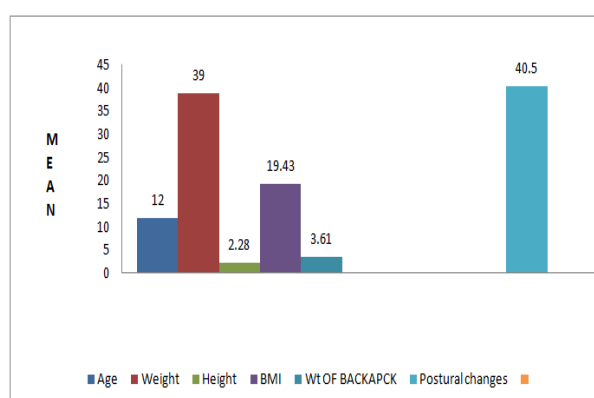


Figure 2

CONCLUSIONS

From this study it can be concluded that there are many issues that surround the use of backpacks including the child's physical and psychological well being as well as knowledge on how to safely carry a backpack. This includes the overall time that the child carries a backpack, time the child climbing stairs while carrying a backpack, the type of backpack used and the design of shoulder straps and back support of the backpack. The relation between backpack and pain may include the child's physical status, the perceived needs of what to carry in the backpack, the best pack for the individual person and how to best carry that pack for the person's unique body composition (size, strength and fitness level)

The aim of this study was to assess the postural changes in school going children carrying backpack. And the mean postural changes were 40.5 with 68.07 sd. The postural changes in children carrying backpack to school found were forward headed, protracted scapulae, right shoulder depressed, left shoulder depressed, sway back, increased lordosis, scoliosis, genu valgum, genu varus, hyperextended knees. The mean weight of school backpacks was 3.6 kg. Backpack-style bags with two straps were found to be the most popular style of schoolbag for both boys and girls. The most common method of carriage was on the back, over two shoulders. The levels of reported discomfort and postural changes were high, and increased as the years progressed.

Competing Interests: No Conflict Of Interest.

Author's Contributions

Author 1-Contribution in the acquisition of the data and also designing and interpretations.

Author 2-Drafting of the manuscript and revising it for intellectual content.

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